

**STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENT
SUPERVISOR OF WELLS**

THE PETITION OF MUSKEGON DEVELOPMENT)
COMPANY FOR AN ORDER FROM THE SUPERVISOR)
OF WELLS APPROVING A UNITIZATION AGREEMENT)
FOR PRIMARY, SECONDARY, AND ENHANCED)
RECOVERY OF OIL, GAS, AND RELATED) ORDER NO. 09-2009
HYDROCARBONS, AND ABROGATING EXISTING)
SPACING ORDERS AND RULES IN THE PROPOSED)
KAWKAWLIN SOUTH UNIT, IN MONITOR AND)
KAWKAWLIN TOWNSHIPS, BAY COUNTY, MICHIGAN.)

OPINION AND ORDER

This case involves the Petition of Muskegon Development Company (Petitioner). The Petitioner is requesting (i) approval of a unitized operation of a portion of the Kawkawlin Field (proposed Unit Area), pursuant to Part 617, Unitization, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); (ii) approval of a secondary recovery operation pursuant to Section 61506(i), Part 615, Supervisor of Wells, of the NREPA and R 324.612; and (iii) approval to operate the proposed Unit Area as an exception to the applicable spacing provisions of Part 615 of the NREPA, and its administrative rules. The proposed Unit Area consists of approximately 2,105.63 acres, including the following:

T14N, R4E, Monitor Township, Bay County, Michigan

Section 1: All of Section 1 except the NE corner of the NE 1/4 of NE 1/4 lying north of the Kawkawlin River.

Section 2: All of that portion of land being part of what is now commonly known as Section 2 lying south of the township line extended, being a line between the N 1/4 corner of Section 3 and the NE 1/4 corner of Section 2.

Section 3: All of that portion of the NE 1/4 lying south of the township line extended, being a line between the N 1/4 corner of Section 3 and the NE corner of Section 2; SE 1/4 of NW 1/4; NE 1/4 of SE 1/4.

Section 11: NE 1/4; NE 1/4 of NW 1/4.

Section 12: N 1/2; N 1/2 of SE 1/4.

T15N, R4E, Kawkawlin Township, Bay County, Michigan

Section 36: That part of the S 1/2 lying S of the Kawkawlin River.

JURISDICTION

The development of oil and gas in this state is regulated under Part 615, Supervisor of Wells; and Part 617, Unitization; of the NREPA, MCL 324.61501, *et seq.* and MCL 324.61701, *et seq.*, respectively. The purpose of Parts 615 and 617 is to ensure the orderly development and production of the oil and gas resources of this state, with a view to the ultimate recovery of the maximum production of these natural resources. MCL 324.61502. To the end of maximizing recovery, the Supervisor of Wells (Supervisor) regulates secondary recovery methods for oil and gas, including the introduction of substances into producing formations for purposes of enhancing production. MCL 324.61506(i). A person proposing secondary recovery by injection of a fluid into a producing formation must file a petition for a public evidentiary hearing. 1996 MR 9, R 324.612. The evidentiary hearing is governed by the applicable provisions of the Administrative Procedures Act, 1969 PA 306, as amended, MCL 24.201, *et seq.* See 1996 MR 9, R 324.1203. The evidentiary hearing in this matter was held on December 10, 2009.

FINDINGS OF FACT

Petitioner specifically requests that the Supervisor issue an Order allowing Petitioner to inject water and other approved substances into the Dundee Limestone Formation, the productive zone, for purposes of secondary and enhanced recovery and exempt the proposed Unit Area from the applicable spacing and proration rules and orders.

In support of its case, the Petitioner offered the testimony of Joel Myler, Vice President, Land and Legal, Muskegon Development Company; and Michael Mesbergen, Petroleum Engineer, Muskegon Development Company. Mr. Mesbergen was recognized as an expert in petroleum engineering.

The Administrative Law Judge determined the Notice of Hearing was properly served and published. An answer to the Petition was filed by Janice Knop, Manager of Wandermeere Enterprises, LLC, outlining concerns with surface use issues. No other answers or protests were filed and no one appeared at the hearing in opposition to the

Petition. The Supervisor designated the hearing to be an evidentiary hearing pursuant to R 324.1205(1)(b) and directed evidence be presented in the form of oral testimony.

I. Unitization

Mr. Myler testified all mineral interests in the proposed Unit Area are subject to valid Oil and Gas Leases and Petitioner owns 93.5 percent of the working interest of those Leases. Mr. Myler stated Petitioner's Unitization Agreement (Exhibit 1) constitutes a plan of unit operations containing all of the required terms and conditions as set forth in subsections 61705(a)-(j) of Part 617 of the NREPA, and expressly provides for the unitized operation of the proposed Unit Area for purposes of secondary recovery and pressure maintenance operations. The Unitization Agreement has been ratified by owners who are entitled to approximately 94.78 percent of all production from the proposed Unit Area.

Petitioner made diligent attempts to contact owners, including mailing of the Unitization Agreement. Wandermeere Enterprises, LLC objected to certain portions of the Unitization Agreement pertaining to easements and surface usage. No other objections were received by the Supervisor from owners within the proposed Unit Area.

I find that Petitioner is a proper applicant, as an interested lessee within the Kawkawlin South Unit, for an Order of Unitization, and therefore qualifies to be named Unit Operator. Petitioner has obtained sufficient approval to support entry of a final order approving unit operations pursuant to Part 617 of the NREPA. I further find that the terms of Petitioner's Unit Agreement are fair, reasonable and equitable. The objections of Wandermeere Enterprises, LLC are issues to be negotiated between the parties outside of this Order.

II. Unit Area

Mr. Mesbergen testified the proposed Unit Area consists of approximately 2,105 acres. Exhibit 10 shows the productive limits of the pool extending to the east beyond the proposed Unit Area. Mr. Mesbergen explained that these wells were not included in the proposed Unit Area because of surface access constraints due to the highly developed residential and commercial land use in the city of Kawkawlin. It is his opinion that creation of the proposed Unit Area does not preclude establishment of another unit to the east and northeast.

Mr. Mesbergen further testified Petitioner plans to conduct unitized operations within a Unitized Formation described as the stratigraphic interval known as the Dundee Limestone Formation.

I find the Unitized Formation as proposed by Petitioner is reasonable and appropriate and should be approved. I find the boundaries of the proposed Unit Area are appropriate. Productive portions of the reservoir underlie each tract within the proposed Unit Area.

III. Secondary Recovery

Mr. Mesbergen testified there are 85 wells currently producing in the proposed Unit Area. Total primary recovery is 6.15 million stock tank barrels of oil (MMSTB) and 84,035 barrels of oil remain to be recovered with primary production operations. Petitioner believes significantly more oil will be recovered as a result of water injection. Mr. Mesbergen's opinion was based upon well records, well location maps, and historic oil production. He believes the Dundee Limestone Formation within the proposed Unit Area exhibits characteristics conducive to a successful water flood based on the performance of the two existing water flood units operated by Petitioner.

Petitioner initially proposes to convert 35 existing wells to water injection wells and inject a combination of fresh water and produced brine at a rate of approximately 1,000 barrels per day (Exhibit 12). The fresh water will come from a township water line which runs through the proposed Unit Area. At this time Petitioner has no plans to drill additional wells but may request permission to drill infill wells in the future. Petitioner intends to consolidate 36 tank batteries into two central tank batteries and install new flow lines and injection lines.

Mr. Mesbergen's secondary recovery production forecast and estimated economics indicate the project will be profitable. Mr. Mesbergen estimated that water injection in the proposed Unit Area would result in incremental oil recovery of 0.605 MMSTB over an eight-year period. Secondary recovery operations would have an estimated capital cost of \$4.8 million dollars and the cost of operations during the first eight years would be \$11.04 million. Petitioner expects to generate gross profit to the working interests in the amount of \$16.58 per barrel produced during the first eight years.

Based on Petitioner's analysis, there is evidence of significant amounts of oil remaining in the reservoir. I find the testimony indicates the proposed Unit Area contains accumulations of hydrocarbons that will not be recovered by primary production of the wells in the field, but may be recovered by secondary recovery operations conducted as a part of a unitized operation. I find the estimated additional cost of unitized operations will not exceed the value of the additional hydrocarbons recovered, and the unitization requested is reasonably necessary to substantially increase recovery of oil from the proposed Unit Area.

The Unitization Agreement allocates unit production among the various tracts comprising the proposed Unit Area based on the percentage of each tract's mineral acres in the unit multiplied by a participation factor calculated using a 50 percent component for cumulative historical production and a 50 percent component for the last three years production. It was Mr. Mesbergen's opinion that the resulting participation factor directly reflects the potential secondary reserves each tract is expected to contribute to total unit production.

Mr. Mesbergen testified abrogation of spacing requirements within the proposed Unit Area would assist Petitioner in implementing its Unitization Agreement and proceeding with unitized operations, including secondary recovery.

I find the allocation of production to the separately owned tracts is fair, reasonable, and equitable as required by Section 61705 of Part 617 of the NREPA.

I find the type of operations contemplated by Petitioner are feasible, will prevent underground waste by recovering oil not otherwise recoverable, and will protect correlative rights. I find abrogation of the existing well location requirements is necessary to implement the Unitization Agreement and proceed with unitized operations, except no well shall be completed in the Unitized Formation at a location closer than 330 feet from the outside boundary of the proposed Unit Area.

CONCLUSIONS OF LAW

Based on the findings of fact, I conclude, as a matter of law:

1. The applicable spacing and well location requirements for the proposed Unit Area are established by existing administrative rules under Part 615 or its predecessor statute.

2. The Supervisor shall issue an order providing for the unit operation of a Unit Area if he or she finds all of the following:

- (a) That the unitization requested is reasonably necessary to substantially increase the ultimate recovery of oil and gas from the Unit Area;
- (b) That the type of operations contemplated by the plan are feasible, will prevent waste, and will protect correlative rights.
- (c) That the estimated additional cost of conducting such operations will not exceed the value of the additional oil and gas so recovered. MCL 324.61704(4).

3. The Supervisor's Order may be declared effective if the Unitization Agreement has been approved by those persons who under the Supervisor's Order will be entitled to at least 90% of all production from the Unit Area or the proceeds of that production. MCL 324.61706.

4. The Supervisor may regulate the secondary recovery methods of oil and gas, including pulling or creating a vacuum and the introduction of gas, air, water, and other substances into the producing formations. MCL 324.61506(i).

5. A person desiring to inject water, gas, or other fluids into a producing formation or use other technology for the purpose of increasing the ultimate recovery of hydrocarbons from a reservoir shall file a petition for hearing. 1996 MR 9, R 324.612(1).

6. The operator of a secondary recovery project shall keep accurate records of all oil, gas, and brine produced, volumes of fluids injected, and injection pressures. The operator shall file reports of the data and other data as may be required with the Supervisor at regular intervals, as specified. 1996 MR 9, R 324.612(2).

7. The Supervisor has jurisdiction over the subject matter and the persons interested therein.

8. Due notice of the time, place, and purpose of the hearing was given as required by law, and all interested persons were afforded an opportunity to be heard. 1996 MR 9, R 324.1204.

DETERMINATION AND ORDER

Based on the Findings of Fact and Conclusions of Law, the Supervisor determines the proposed unitization is necessary to prevent waste and to maximize the recovery of hydrocarbons from the proposed Unit Area.

NOW, THEREFORE, IT IS ORDERED:

1. The Petition of Muskegon Development Company is granted, and the proposed Unit Area is created in accordance with, and subject to, this Order and the provisions of the Unitization Agreement, which is hereby incorporated by reference. The proposed Unit Area shall hereafter be known as the Kawkawlin South Unit.

2. Muskegon Development Company is appointed Unit Operator.

3. The Kawkawlin South Unit is described as:

T14N, R4E, Monitor Township, Bay County, Michigan

Section 1: All of Section 1 except the NE corner of the NE 1/4 of NE 1/4 lying north of the Kawkawlin River.

Section 2: All of that portion of land being part of what is now commonly known as Section 2 lying south of the township line extended, being a line between the N 1/4 corner of Section 3 and the NE 1/4 corner of Section 2.

Section 3: All of that portion of the NE 1/4 lying south of the township line extended, being a line between the N 1/4 corner of Section 3 and the NE corner of Section 2; SE 1/4 of NW 1/4; NE 1/4 of SE 1/4.

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T15N, R4E, Kawkawlin Township, Bay County, Michigan

Section 36: That part of the S 1/2 lying S of the Kawkawlin River.

4. The Unitized Formation is described as:

The stratigraphic interval known as the Dundee Limestone Formation within the Unit Area.

5. Muskegon Development Company shall notify the Supervisor between 30 and 60 days prior to the commencement of injection operations, and between 30 and 60 days prior to the anticipated date of abandonment of injection operations. Petitioner shall comply with the filing requirements of R 324.610, R 324.612, and R 324.806 of the administrative rules of Part 615 of the NREPA and shall obtain such approvals as are necessary from the Department of Natural Resources and Environment.

6. Each tract within the Kawkawlin South Unit shall participate in the unit production and other benefits and burdens of unit operations in accordance with the Unitization Agreement.

7. Operation of the Kawlawlin South Unit shall be conducted exclusive of and as an exception to all applicable spacing orders and rules, except no well may be completed in the Unitized Formation at a location closer than 330 feet from the outside boundaries of the Kawkawlin South Unit Area. Muskegon Development Company is authorized to produce wells on the Unit Area at rates that result in the maximum efficient recovery of hydrocarbons. All other applicable provisions of the administrative rules of Part 615 of the NREPA shall be adhered to.

8. The unitized operations shall initially be accomplished by the injection of purchased fresh water or produced brine. Other substances may only be injected with written approval from the Supervisor.

9. Surface injection pressure shall not exceed a pressure determined by the following equation unless written approval is obtained from the Supervisor:

$$P_m = (fpg - 0.433sg)d$$

where

P_m = surface injection pressure

fpg = fracture pressure gradient (if unknown, assume 0.800)

sg = specific gravity of the injection liquid (if unknown, assume 1.2)


d = injection depth in feet (true vertical depth).

10. The Unitization Agreement, which constitutes the plan for unit operations, is hereby approved; and unit operations thereunder may be commenced as of the effective date determined by the Unit Operator consistent with Article 15 of the Unitization Agreement. Cessation of the unit operations shall be in accordance with the Unitization Agreement and only with the written approval of the Supervisor.

11. The Supervisor retains continuing jurisdiction over the Kawkawlin South Unit in order that the Supervisor may exercise such administrative control as is consistent with the powers and duties of the Supervisor, as established by Part 615 and Part 617 of the NREPA.

12. This Order shall be effective immediately.

Dated: Feb. 11, 2010


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